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Selected US specifications from IPC sub-class
E05D

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(54) A door hinge

(57) A door hinge for a vehicle door, especially a rear door of a van, which allows the door to be opened through 180° has one leaf 18 connected to the door and another leaf 20 connected to the vehicle side wall. A third leaf 22 is connected on parallel axes 24 and 26 to the first and second leaves. A locking mechanism is provided which ensures that, at any one time, the door is pivoting on only one of the axes 24 and 26. A lever 32 pivoted on leaf 22 initially engages a recess on the leaf 20 until the leaf 18 has pivoted through 90° about axis 24 and then the lever engages a recess on leaf 18 and a further pivoting through 90° takes place about axis 26. A second lever on the opposite face of leaf 22 to the lever 32 is engageable with detent on leaves 18, 20 to provide a check in the 0°, 180° and preferably the 90° positions.

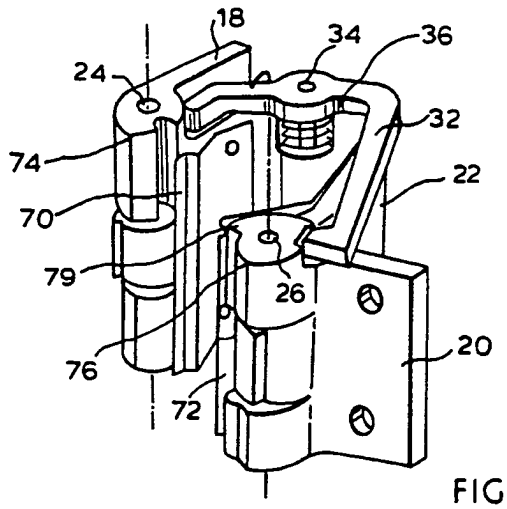

FIG. 5.

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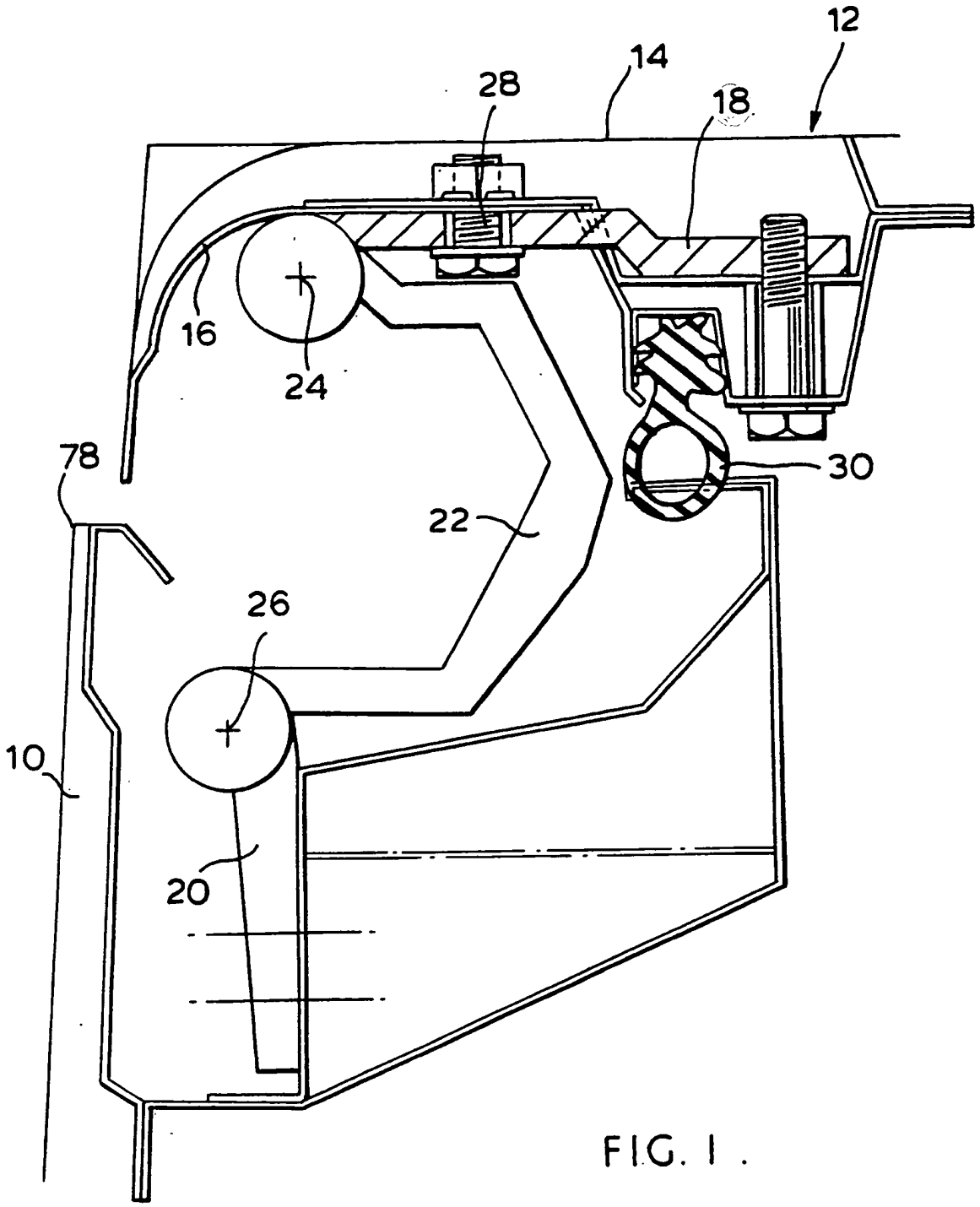

FIG. 1.

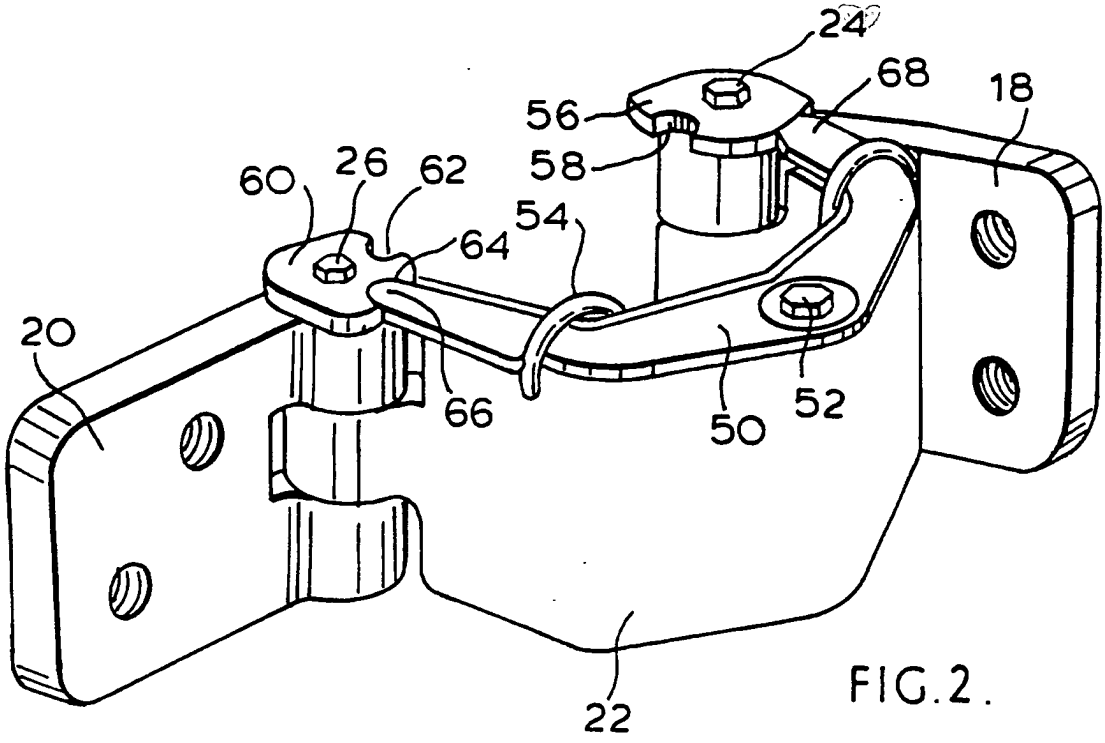

FIG.2.

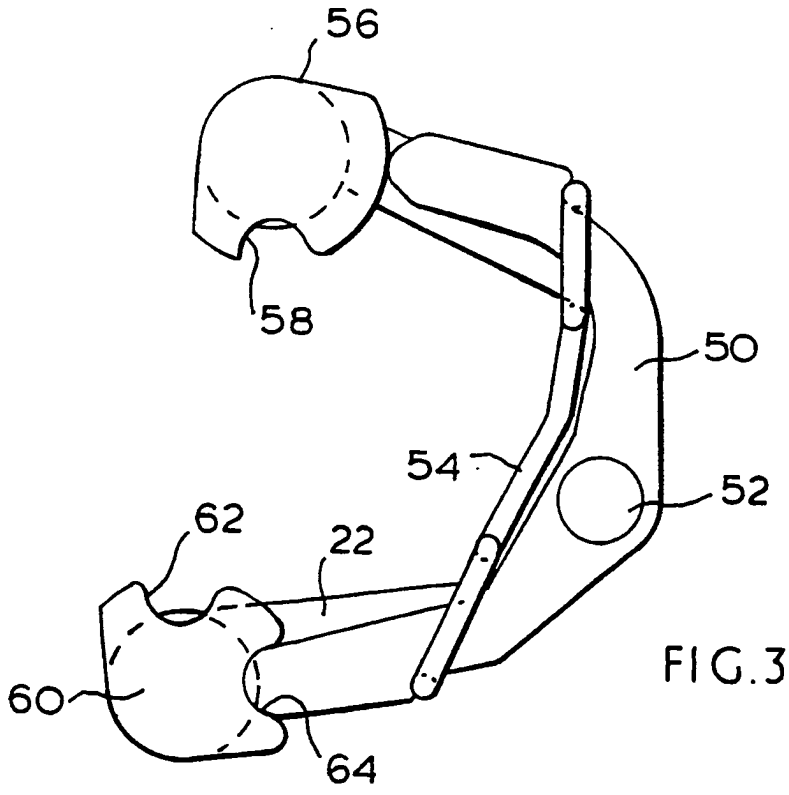

FIG.3.

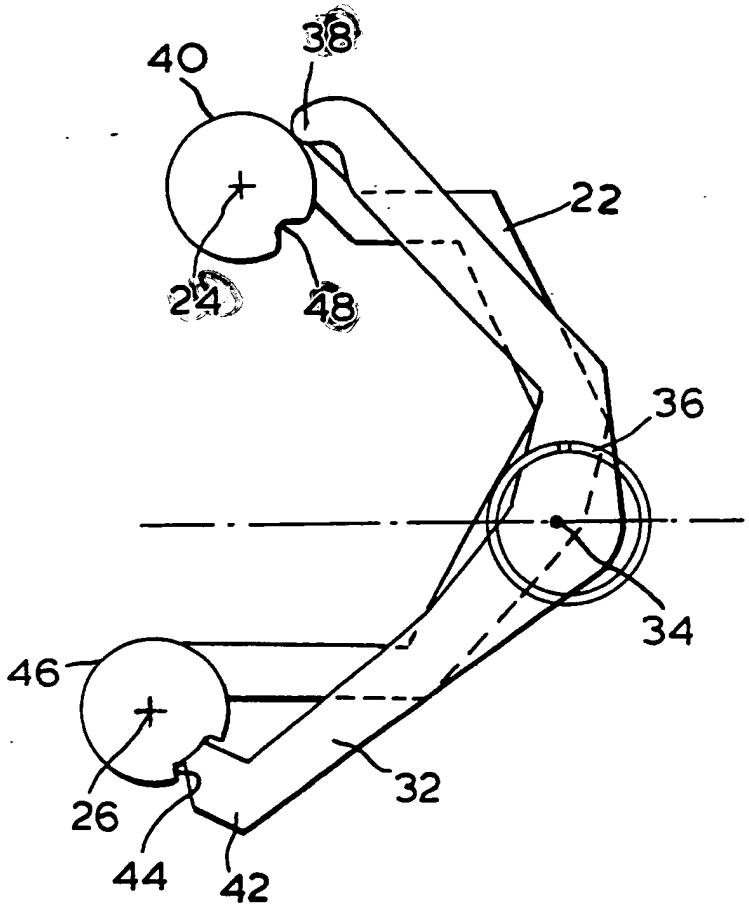

FIG.4.

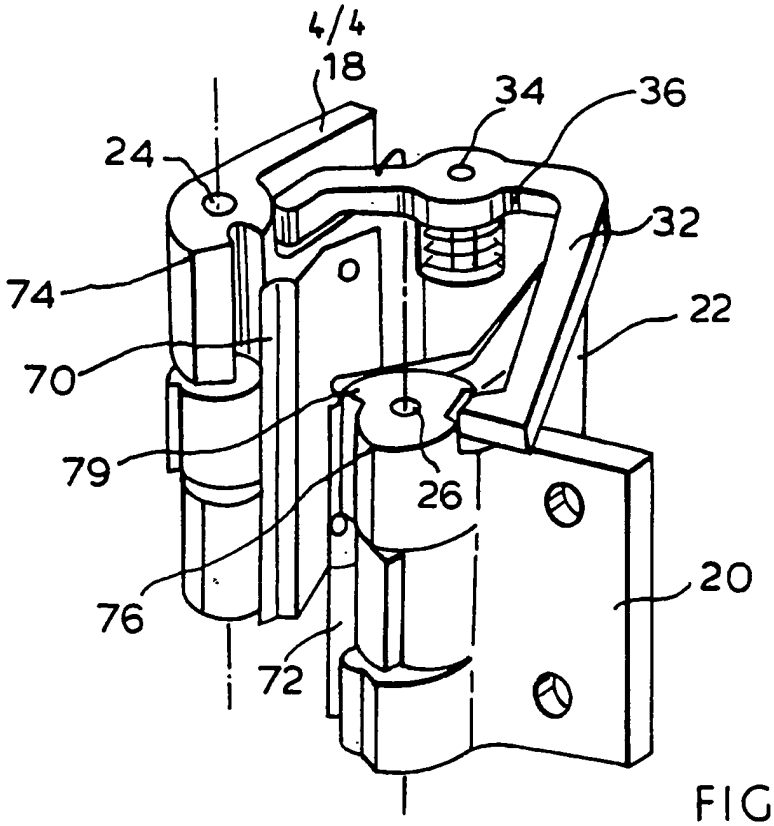
18
34
36
24
32
74
22
70
79
26
20
76
72

FIG. 5.

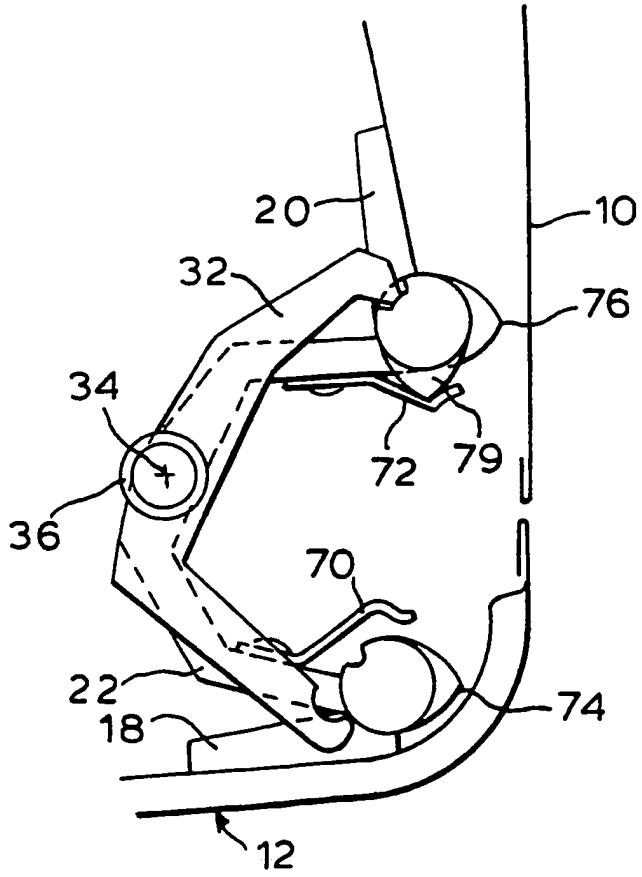
20
10
32
76
34
72
79
36
70
22
74
18
12

FIG. 6.

Door Hinge

This invention relates to a door hinge, for example for the rear doors of a van. The invention is particularly concerned with hinges which will permit van doors to be opened through 180° , thereby to leave a maximum sized opening for the loading of goods.

The invention is also particularly applicable to van door constructions of the type where the external joint line between the door and the van wall is on the side of the van, rather than on the rear face of the van. The combination of this type of van door with a 180° opening hinge can provide unimpeded access to the van interior.

According to the invention, there is provided a door hinge comprising a first hinge leaf to be attached to the door, a second hinge leaf to be attached to the door frame and a third hinge leaf pivoted at one end to the first leaf on a first pivot axis and at the other end to the second leaf on a second pivot axis, the leaves being arranged so that, in use, they permit 180° opening of the door relative to the door frame, and wherein a locking mechanism is provided on one of the pivot axes to prevent rotation about that axis until rotation of substantially 90° has taken place about the other axis.

In this way, one axis of rotation is locked until sufficient rotation has taken place about the other axis and this ensures that the hinge movement when the door is opened or closed takes place in the correct sequence and that the door is always pivoting on one axis only.

Preferably a check mechanism operates at the door fully closed, position, at the 90° open position and at the 180° open position.

The locking mechanism is preferably arranged so as to act between the first and second pivot axes and can conveniently take the form of a lever pivoted on the third leaf with a first end biased against a surface associated with the first pivot axis and a second end co-operating with a surface on the second pivot axis. While movement about the first pivot axis is taking place, the second end will normally engage in a recess on the second axis which results in the third leaf being locked to the second leaf, while the first end rides against a circular surface centred on the first pivot axis. The first end then drops into a detent so as to lock movement about the first axis after 90° rotation has taken place. The action of the lever dropping into the detent frees the second end from the recess and thereby allows pivoting movement between the third leaf and the second leaf and the second axis.

The check mechanism may comprise a second lever pivoted on the third leaf and biased into engagement with cam surfaces centred on both the first and second pivot axes.

Alternatively, the check mechanism may comprise plate springs mounted on the third leaf and projecting noses on the hinge axes to provide the necessary check function.

Where two levers are mounted on the third leaf, one can be mounted at the top of the leaf and the other on the underface of the leaf.

The invention also provides a van having two rear doors hinged to the vehicle, wherein the outer, generally vertical edges of the doors lie on the sides of the vehicle, and wherein the doors are connected to the vehicle through hinges which open through substantially 180°.

Preferably at least one of the hinges associated with each door, normally the lowermost hinge, has a locking mechanism and a check mechanism as set forth above.

The invention will now be further described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a horizontal section taken through a rear corner of a van fitted with a hinge in accordance with the invention;

Figure 2 is a perspective view of the hinge shown in Figure 1;

Figure 3 is a plan view of the hinge shown in Figure 2;

Figure 4 is a view on the underside of the hinge of Figure 2;

Figure 5 is a perspective view of a second form of hinge in accordance with the invention; and

Figure 6 is a plan view of the hinge of Figure 5.

Figure 1 shows a van having a side wall 10 and a rear door 12. The door has an outer skin 14 and an inner skin 16. The door is mounted on the van by means of a first hinge leaf 18, a second hinge leaf 20 and a third hinge leaf 22. The first and third hinge leaves 18 and 22 are connected to one another on a pivot axis 24, and the second and third leaves 20 and 22 are connected to one another on a pivot axis 26.

Figure 1 shows the van door 12 in its closed position and it will be noted that one of the bolts 28 securing the

leaf 18 to the door is concealed by the third leaf 22 in the door closed position so that even if a thief should break glass in the rear window of the van, it would not be possible to unbolt the door from its hinges and thus obtain access into the vehicle.

Figure 1 also shows a weather strip 30 which will provide the necessary seal between the door and the rest of the van when the door is closed.

The locking mechanism is shown schematically in Figure 4 and comprises a lever 32 pivoted at 34 to the third lever 22. A coil spring 36 acts on the lever in an sense so that the nose 38 of the lever is pressed against a surface 40 of the first leaf 18 which is centred around the first pivot axis 24. The other end 42 of the lever enters a recess 44 on a surface 46 of the second leaf which is centred around the second pivot axis 26. The engagement of the lever in the recess 44 "locks up" the second pivot axis.

Once 90° rotation about the axis 24 has taken place, the nose 38 drops into a recess 48 on the surface 40. This results in the other end of the lever 32 coming out of the recess 44 and releasing the second pivot axis 26. At this point therefore, the door changes from movement about the axis 24 to movement about the axis 26.

The lever 32 is mounted on the underface of the third leaf 22. The lever is not however shown in the perspective view of Figure 2.

On the top face of the third leaf. a second lever 50 is mounted on a mounting point 52. The lever is also restrained by a spring 54. On the pivot axis 24, a first cam 56 is mounted and is rigidly attached to the hinge leaf 18. This cam has one cam recess 58. On the pivot axis

26, there is a second cam 60 rigidly fixed to the second leaf 20 and with two cam recesses 62 and 64.

Either one or both cams 56 and 60 could be formed as integral parts of their respective hinge leaves.

In use, and in the "door closed" position shown in Figures 2 and 3, a check function is provided by engagement of a nose 66 in the recess 64. As the door is opened, the lever is cammed out of the recess. The mounting of the lever at 52 allows for this movement of the lever, against the restraining force applied by the spring 54 (see Figure 3).

When the 90° door position is reached, the nose 68 drops into the recess 58. Movement beyond the 90° position towards the 180° position causes the nose 66 to be cammed out of the recess 64, and upon arrival at the 180° fully open position, the nose 66 drops into the recess 62. A check function is thus provided in two different positions.

Figures 5 and 6 show a hinge which has a locking mechanism the same as that in Figures 1 to 4, and the same reference numerals have been used. The check mechanism is however different.

To provide this check mechanism, two shaped plate springs 70 and 72 are fastened to the third leaf 22. On the first and third leaves are protruding noses 74, 76 and 79. These noses engage in the shaped parts of the springs 70 and 72 to provide check functions at the door closed, at the 90° and fully open (180°) positions.

The hinge described thus allows a full 180° opening of a vehicle door in a simple and secure construction, particularly where the door shut line 78 (Figure 1) is at the side rather than at the rear of the vehicle body.

Normally the locking and check functions will be present only on the lower hinges of each door, and the upper hinges will simply have three leaves mounted on two pivot axes.

Claims

1. A door hinge comprising a first hinge leaf to be attached to the door, a second hinge leaf to be attached to the door frame and a third hinge leaf pivoted at one end to the first leaf on a first pivot axis and at the other end to the second leaf on a second pivot axis, the leaves being arranged so that, in use, they permit 180° opening of the door relative to the door frame, and wherein a locking mechanism is provided on one of the pivot axes to prevent rotation about that axis until rotation of substantially 90° has taken place about the other axis.

2. A hinge as claimed in Claim 1, wherein a check mechanism is provided which operates at the door fully closed position and at the 180° open position.

3. A hinge as claimed in Claim 2, wherein the check mechanism also operates at the 90° open position.

4. A hinge as claimed in any preceding claim, wherein the locking mechanism is arranged so as to act between the first and second pivot axes.

9. A van having two rear doors hinged to the vehicle, wherein the outer, generally vertical edges of the doors lie on the sides of the vehicle, and wherein the doors are connected to the vehicle through hinges which open through substantially 180° .

10. A van as claimed in Claim 10, wherein at least one of the hinges associated with each door is a hinge as claimed in any preceding claim.

11. A van as claimed in any preceding claim, wherein each door is supported by two hinges, each lower hinge is as claimed in any preceding claim, and each upper hinge has a first hinge leaf to be attached to the door, a second hinge leaf to be attached to the door frame and a third hinge leaf pivoted at one end to the first leaf on a first pivot axis and at the other end to the second leaf on a second pivot axis, the leaves being arranged so that, in use, they permit 180° opening of the door relative to the door frame.

12. A door hinge substantially as herein described, with reference to any one embodiment shown in the accompanying drawings.

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DERWENT-WEEK: 198842

TITLE: Door hinge for motor vehicle - has double pivot axis to allow wide opening of door

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PATENT-ASSIGNEE: FORD MOTOR CO LTD[FORD]

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INT-CL (IPC): E05D003/06, E05D011/10

ABSTRACTED-PUB-NO: GB 2203483A

BASIC-ABSTRACT:

The door hinge for a rear door of a van, allows the door to be opened through 180 degrees. It has one leaf (18) connected to the door and another leaf (20) connected to the vehicle side wall. A third leaf (22) is connected on parallel axes (24 and 26) to the first and second leaves. A lock is provided which ensures that, at any one time, the door is pivoting on only one of the axes (24 and 26). A lever (32) pivoted on the third leaf (22)

initially engages a
recess on the second leaf until the first leaf has pivoted through 90 degrees
about axis (24) and then the lever engages a recess on the first leaf and a
further pivoting through 90 degrees takes place about another axis 26.

A second lever is engageable with a detent on two leaves to provide a check in
the 0 degrees, 180 degrees and preferably the 90 degrees positions.

ADVANTAGE - Can provide unimpeded access to van interior.

CHOSEN-DRAWING: Dwg.5/6

TITLE-TERMS: DOOR HINGE MOTOR VEHICLE DOUBLE PIVOT AXIS ALLOW WIDE OPEN DOOR

DERWENT-CLASS: Q47

SECONDARY-ACC-NO:
Non-CPI Secondary Accession Numbers: N1988-223936